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Assessment of Industry Investment in U.S. Domestic Production of Strategic Materials

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Karen W. Tyson
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PREFACE

The Institute for Defense Analyses (IDA) prepared this paper for the Office of the Deputy Under Secretary of Defense (Industrial Policy) under a task titled "Reinvestment in Domestic Sources of Strategic Materials Study." The task objective was to provide analysis related to issues raised in the 2008 National Defense Authorizations Act concerning the extent to which domestic producers of strategic materials are investing to ensure continued domestic production of these materials. This paper describes the results.

Stanley A. Horowitz and Michael A. Rigdon of IDA were the technical reviewers for this paper. The authors would like to thank Kuni Chen, William McMurtrie, and Roudy Romulus for their contributions and suggestions. The authors would also like to thank Jim Woolsey for ongoing guidance and suggestions.

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I. INTRODUCTION

A. CONGRESSIONAL REQUIREMENT

Section 803 of the National Defense Authorization Act for Fiscal Year 2008 requires that the Strategic Materials Protection Board (SMPB) "perform an assessment of the extent to which domestic producers of strategic materials are investing and planning to invest on a sustained basis in the processes, infrastructure, workforce training, and facilities required for the continued domestic production of such materials to meet national defense requirements."

The SMPB membership includes representatives of the following offices: the Secretary of Defense; the Under Secretary of Defense for Acquisition, Technology, and Logistics; the Under Secretary of Defense for Intelligence; and the Secretaries of the Army, Navy, and Air Force. The Deputy Under Secretary of Defense for Industrial Policy, who acts as the board's Executive Secretary, tasked IDA to help with the assessment. This paper is the result.

B. FINDINGS IN BRIEF

IDA found that U.S. strategic materials producers are investing for continued domestic production. The titanium sector is investing aggressively for dramatic expansion in anticipation of a growing share of global commercial aerospace material markets. The specialty steel sector is starting to invest more capital for more modest growth to serve expanding markets worldwide. Several of the companies that we examined are planning future investments as well. Our analysis was made prior to the worsening global financial crisis in September 2008. The forecasts of global recession that emerged from the crisis could negatively affect further capital investments by the sector.

C. BACKGROUND

For this assessment, the sponsor of the study has defined a strategic material as the specialty metals included in Section 2533b of Title 10, United States Code, Protection of Strategic Materials Critical to National Security.

Section 2533b provides the following definition for "specialty metal":[1]

> (1) Steel—
>
> (A) with a maximum alloy content exceeding one or more of the following limits: manganese, 1.65 percent; silicon, 0.60 percent; or copper, 0.60 percent; or
>
> (B) containing more than 0.25 percent of any of the following elements: aluminum, chromium, cobalt, columbium, molybdenum, nickel, titanium, tungsten, or vanadium.
>
> (2) Metal alloys consisting of nickel, iron-nickel and cobalt base alloys containing a total of other alloying metals (except iron) in excess of 10 percent.
>
> (3) Titanium and titanium alloys.
>
> (4) Zirconium and zirconium base alloys.

The sponsor of the study has also designated high-purity beryllium as a strategic material because of its importance to the United States and its allies for defense and critical civilian applications.

Section 2533b offers protection to U.S. producers by requiring that strategic materials purchased by the Department of Defense be melted or produced in the United States [***emphasis added***]:

> (a) Requirement—Except as provided in subsections (b) through (m), the acquisition by the Department of Defense of the following items is prohibited:
>
> (1) The following types of ***end items, or components thereof, containing a specialty metal not melted or produced in the United States***: aircraft, missile and space systems, ships, tank and automotive items, weapon systems, or ammunition; or
>
> (2) ***A specialty metal that is not melted or produced in the United States*** and that is to be purchased directly by the Department of Defense or a prime contractor of the Department."

---

[1] 10 USC, Section 2533b, Requirement to buy strategic materials critical to national security from American sources; exceptions, as amended by the FY 2008 National Defense Authorization Act, Section 804, Clarification of the Protection of Strategic Materials Critical to National Security.

D. STRUCTURE OF THE REPORT

This report discusses IDA's assessment of domestic investment in sustained production of strategic materials. The next chapter describes data and methods used, including identification of the domestic producers of strategic materials, development of a data request to the companies, and evaluation criteria. Chapter III presents analyses of company investment using public data, and Chapter IV provides a non-proprietary summary of the survey results.

II. DATA AND METHODS

A. IDENTIFICATION OF COMPANIES

We used a number of resources to identify domestic producers of strategic materials. We consulted the Defense Contract Management Agency and the Specialty Steel Industry of North America, performed a literature search, and also consulted a major customer for strategic metals, the Boeing Corporation.

Figure 1 shows the metals production process flow. We chose companies associated with the processes that are the principal areas of concern, shaded in pink in Figure 1. These processes involve products protected by Section 2533b. In addition to the processes shown in the pink shaded areas, the titanium companies in our sample are vertically integrated upstream to include the processing of titanium containing ore into metal sponge, titanium's base metal form. On the other hand, producers of special steel, nickel, cobalt, and other metals are more focused on alloy production and basic shapes and have little or no vertical integration upstream. All of the companies in our sample have some scrap processing operations that offer a closed loop recycling operation.

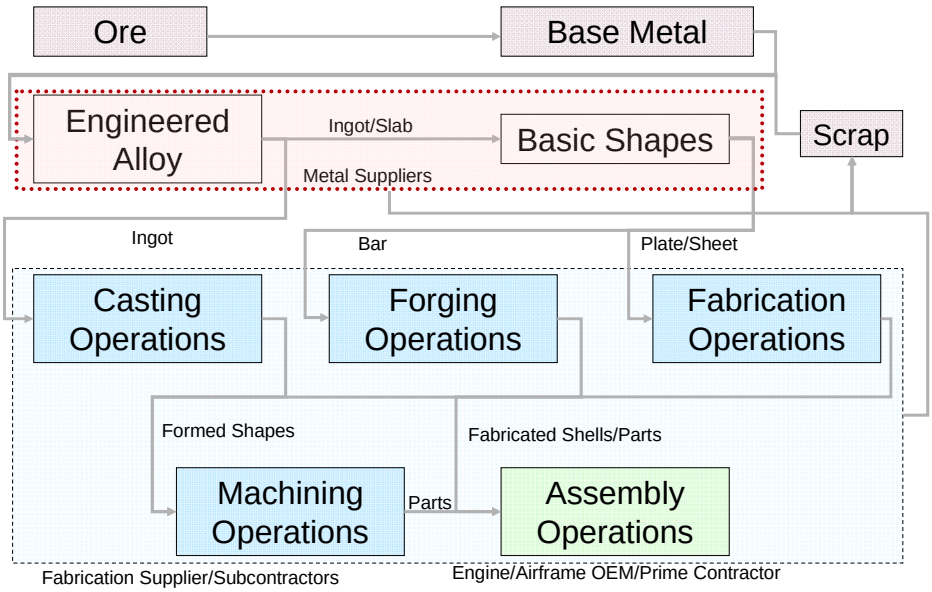


Figure 1. Metal Process Flow

Only two of the eighteen companies in our sample (see Table 1), Special Metals and Howmet, have significant vertical integration downstream into casting and forging operations. These companies are units of larger firms that are heavily vertically integrated: Precision Castparts (Special Metals) and Alcoa (Howmet).

In addition to listing the firms in the study, Table 1 identifies those we visited and indicates whether they submitted data to us.

Table 1. Special Metals Companies in Data Request

Company	Alloy	Visit[a]	Data Provided?
Howmet[b]	Titanium/Nickel Alloy	No	Yes
Allegheny Technologies[c]	All Special Metals	Yes	Yes
RTI International Metals[c]	Titanium	No	Yes
Titanium Metals (TIMET)[c]	Titanium	Yes	Yes
ArcelorMittal Steel USA[b]	Specialty Steel	Yes	Yes
Latrobe Specialty Steel	Specialty Steel	Yes	Yes
Carpenter Technology[c]	Specialty Steel	Yes	Yes
Crucible Specialty Metals	Specialty Steel	No	No
Electralloy	Specialty Steel	No	Yes
Outokumpu Stainless[c]	Specialty Steel	No	Yes
ThyssenKrupp VDM/Stainless USA[b]	Stainless Steel/ Nickel Alloy	No	Yes
Universal Stainless & Alloy Products[c]	Stainless Steel	No	No
Valbruna Slater Stainless	Stainless Steel	No	Yes
Haynes International[c]	Nickel/Cobalt Alloys	Yes	Yes
Special Metals[b]	Nickel/Cobalt Alloys	No[d]	Yes
Molycorp[b]	Rare earth magnets	No	Yes
Western Zirconium[b]	Zirconium	No	No
Brush Wellman[b]	Beryllium	No	Yes

[a] We did not request a visit from every company, but tried to visit a broadly representative group of firms.
[b] Financial reporting consolidated into much larger public parent company.
[c] Publically held companies; financial data publically available.
[d] Conference call.

B. DATA COLLECTION

Our study used publicly available data concerning the firms being studied, and also collected data from the firms themselves. We surveyed these companies with a questionnaire (see Appendix A) designed to cover the areas designated in the legislation and help determine the extent to which domestic companies are investing in strategic materials. The background information we requested from each company included which of the company's products are protected by Section 2533b, financial variables (annual revenue, operating profit, training expense, research and development expense, capital spending, assets, depreciation and amortization) broken out by product or business segment, by plant or location, and by defense versus non-defense. The questionnaire also

explored the nature of investment decisions, both what to invest in and how much to invest, were explored. Information on company training budgets and any sponsorship of higher education in U.S. universities was sought.

Table 1 shows that all but three firms responded to inquiries for data and visits. Most firms responded to the questionnaire, but not all provided all the requested breakdowns. As we expected, data formats varied widely.

C. EVALUATION CRITERIA

Our major objective is to determine the degree to which firms in the special metals sector are investing in new product and facilities. We focused on capital expense (CAPEX). This expense category is tracked and reported by most public companies in their quarterly and annual financial statements to the Securities and Exchange Commission (SEC).

To evaluate the degree of investment, we divided CAPEX by annual depreciation and amortization (D&A). When this ratio is greater than unity (or 100 percent), the firm or business segment is growing its physical plant; that is, it is investing more than its annual depreciation write-offs. If the ratio is close to unity, the firm is maintaining its physical assets; if the ratio is less than unity, the firm is writing off assets without replacing or refurbishing them. This broad indicator is used in the metals industry, as shown by conference calls with investors and consultation with a metals industry financial analyst.

We included research and development (R&D) expense, even though it is not mentioned in the legislation, to capture investments in new products, alloys, or processes that are accrued in annual expenses. Most firms do not explicitly accumulate R&D intangible assets on their balance sheets. Consequently, we measured R&D as a percentage of revenue.

To assess the special metals industry's investment efforts, we benchmarked CAPEX/D&A against peers. Peers include other companies not protected by Section 2533b, such as foreign special metals, aluminum, or U.S. carbon steel producers. We also compared the protected firms to sector averages.

From the individual companies, we requested detailed revenue, capital expenditures, R&D expense, and assets data sliced by customer and business segment. We were interested in the percentage of defense or dual business done by the company. Since specialty metals producers are in the lower tiers of the defense industrial base, they

often do not sell directly to defense prime contractors, and they may not know how much of their shipments are destined for weapon systems. The survey also requested detailed project-level information that describes the basis for the investment. We asked firms to categorize investment drivers for capacity, maintaining aging equipment, new product or alloys, process improvement, and so on. Appendix A contains the questions provided to the companies.

III. RESULTS

A. FINDINGS FROM INDUSTRY-PROVIDED DATA

Since most of the companies requested that their information be treated as company proprietary, we provide here only a general summary of the survey responses.

Both the data we gathered and the impressions we gained from our visits indicate that special metals companies are investing for continued domestic production. The survey responses indicate that U.S. producers of strategic materials are generally making capital expenditures in amounts greater than 100 percent of depreciation and amortization in 2007. The titanium sector is aggressively investing for a major jump in aerospace demand, as titanium and composites take an increasing share of the commercial aerospace materials market. For example, in the near future, new lighter and more fuel-efficient wide-body commercial aircraft will use dramatically more titanium and composite materials in their structures. The specialty steel sector is more conservatively investing for more modest growth. Demand for special steels is coming from expanding markets where these materials already dominate (e.g., applications where high strength in high temperatures or corrosive environments are important, such as aircraft landing gear, rotating turbine components, and industrial applications). The industry appears to be focusing on those high-performance markets rather than trying to penetrate automotive or other consumer applications where it is harder to achieve a payoff for high performance. The companies generally determine their investment plans by analyzing the potential returns of candidate investments rather than by benchmarking their investments against their peers.

Commercial demand, rather than defense demand, appears to dominate investment plans. We asked the companies to characterize their revenue as defense, non-defense, and/or dual. The companies that provided estimates put defense at 5–20 percent of their overall business, although their status as lower-tier defense suppliers made this estimate difficult for them to determine.

Training budgets are driven by safety requirements, government requirements, and employee needs. Most companies sponsor graduate R&D studies with universities, although we do not know how large the efforts are.

B. FINANCIAL ANALYSIS OF COMPANY INVESTMENT USING PUBLIC DATA

To provide a non-proprietary analysis, we evaluated the financial data of the public companies in the group. Table 2 lists the special metals suppliers that are publicly traded and filed financial reports with the U.S. Securities and Exchange Commission for 2007. The top three companies are the key U.S. suppliers of titanium metal in plate, bar, or ingot form for use in final products. Brush Wellman is the only supplier of beryllium metal. Allegheny Technologies, ArcelorMittal Steel, Universal Stainless, and Carpenter Technology are suppliers of specialty steels. (Table 2 shows ArcelorMittal's stainless segment financials only.) Allegheny Technologies and Carpenter produce nickel and, in some cases, cobalt alloys. Allegheny Technologies also produces zirconium metal products.

Table 2. Key Financial Metrics of Special Metals Companies and Select Comparisons, 2007 ($ Millions)

Company	Revenue	CAPEX	D&A	CAPEX/ D&A	R&D	R&D/ Revenue
Special Metals Companies						
TIMET	$1,231	$123	$44	2.83	$4	0.3%
Allegheny Technologies	5,423	502	107	4.71	15	0.3%
RTI International Metals	632	71	17	4.22	2	0.3%
Brush Wellman	932	34	27	1.27	5	0.6%
ArcelorMittal—Stainless	9,349	263	275	0.96	—	0.0%
Universal Stainless	231	11	4	2.78	—	0.0%
Carpenter Technology	2,035	92	50	1.84	12	0.6%
Reference Metal Suppliers						
AK Steel Holding	7,075	126	209	0.60	8	0.1%
United States Steel	18,313	711	551	1.29	—	0.0%
Nucor	17,798	655	450	1.46	—	0.0%
POSCO (South Korea)	33,769	3,090	2,272	1.36	56	0.2%
Outokumpu Stainless	10,090	324	297	1.09	28	0.2%
Alcoa	30,215	3,601	1,284	2.80	263	0.9%
International Paper	22,341	1,325	1,110	1.19	—	0.0%
Precision Castparts	6,852	226	130	1.74	—	0.0%
Chevron	222,327	17,870	8,960	1.99	—-	0.0%
Reference Other Sector Companies						
Boeing	67,012	1,689	1,492	1.13	3,720	5.6%
Intel	39,155	4,546	4,712	0.96	5,822	14.9%
Caterpillar	46,738	3,181	1,857	1.71	1,433	3.1%

Source: Computstat.

The remaining companies are listed for the purposes of comparison with the U.S. strategic materials producers. AK Steel, U.S. Steel, Nucor, and POSCO are major steel

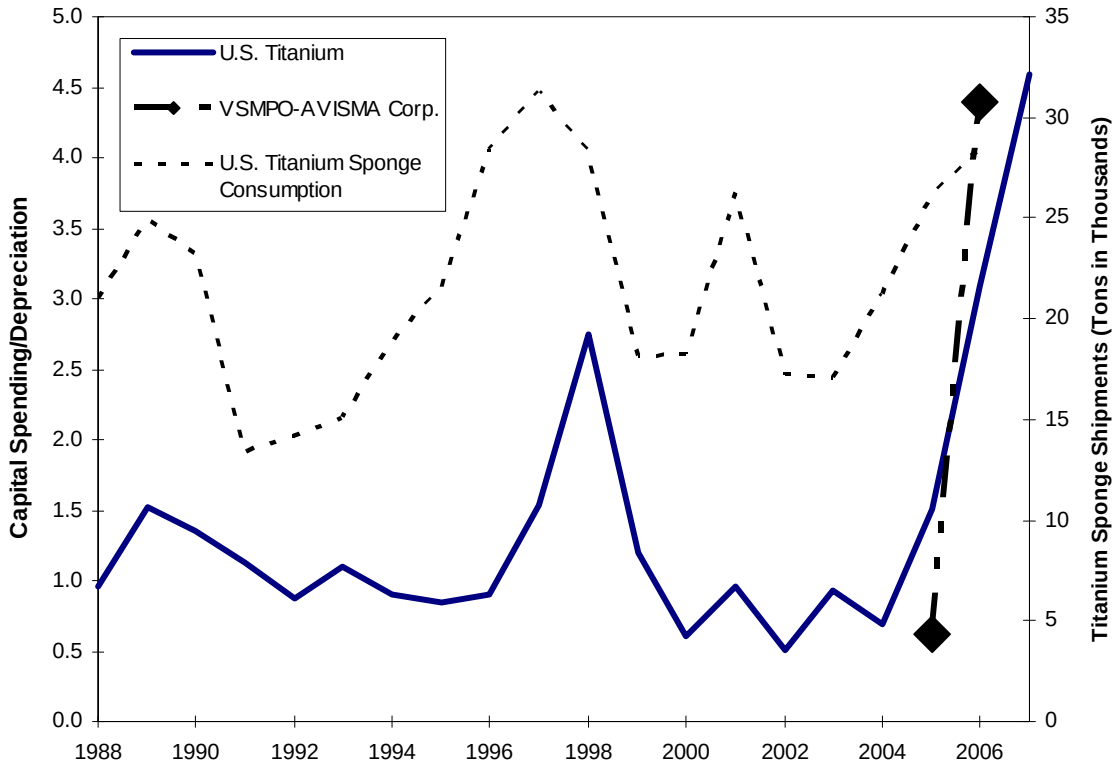
companies whose main businesses are carbon steels, which are not protected by Section 2533b. Outokumpu Stainless presumably is protected by the statute in the United States; however, most of its sales, production, and investment are not in North America. Although Alcoa's Howmet acquisition provided data on strategic materials to our sample, Alcoa is included as a reference because its revenue comes mainly from aluminum products. Precision Castparts, a major aerospace/defense metal components supplier, is also listed as a reference company, even though one of its divisions, Special Metals, is a strategic material supplier. Boeing, Intel, and Caterpillar are included as representatives of firms outside the metals industry. These companies are all capital-intensive but have shorter product life cycles and, consequently, a higher R&D/revenue ratio.

The seven public strategic metals producers included in the table generally have CAPEX/D&A ratios higher than the reference companies, both in the metals sector and in other sectors. Allegheny Technologies and RTI International Metals are investing at a level four times their depreciation and amortization.

Analysis of historical data is consistent with this one-year snapshot and shows that strategic metals producers are investing. Figure 2 shows that U.S. titanium producers were below the critical CAPEX/D&A value of 1.0 from 2000 to 2004, but have recently increased their investment substantially, on a par with the Russian titanium company VSMPO-AVISMA Corporation. VSMPO-AVISMA is a major competitor to the U.S. titanium companies in commercial aerospace, where Section 2533b does not apply. Note also that the U.S. titanium industry's CAPEX/D&A ratio is consistent with the pattern of U.S. titanium sponge consumption, which is an indicator of overall demand for titanium. This correlation implies that the companies are making investments to meet demand.

Figure 3 shows that U.S. specialty steel producers, those producing products protected by Section 2533b, have been investing above the level of D&A since 2005. Their CAPEX/D&A ratio is lower, however, than a comparison group of carbon steel producers not protected by Section 2533b. This may be because carbon steel producers are responding to different demand for their products. The demand for carbon steel products is driven by emerging markets for consumer end items, such as autos and construction. Demand for specialty steel products are driven by markets for engineered materials in capital items that suffered more in the capital spending-led 2001 recession, such as aircraft and land-based turbines. The chart also shows Outokumpu's CAPEX/D&A ratio for the years they reported. The ratio reflects their "Specialty Stainless" segment; however, in 2007 North America accounted for only 10 percent of sales and about 2 percent of capital spending. These data then represent a direct

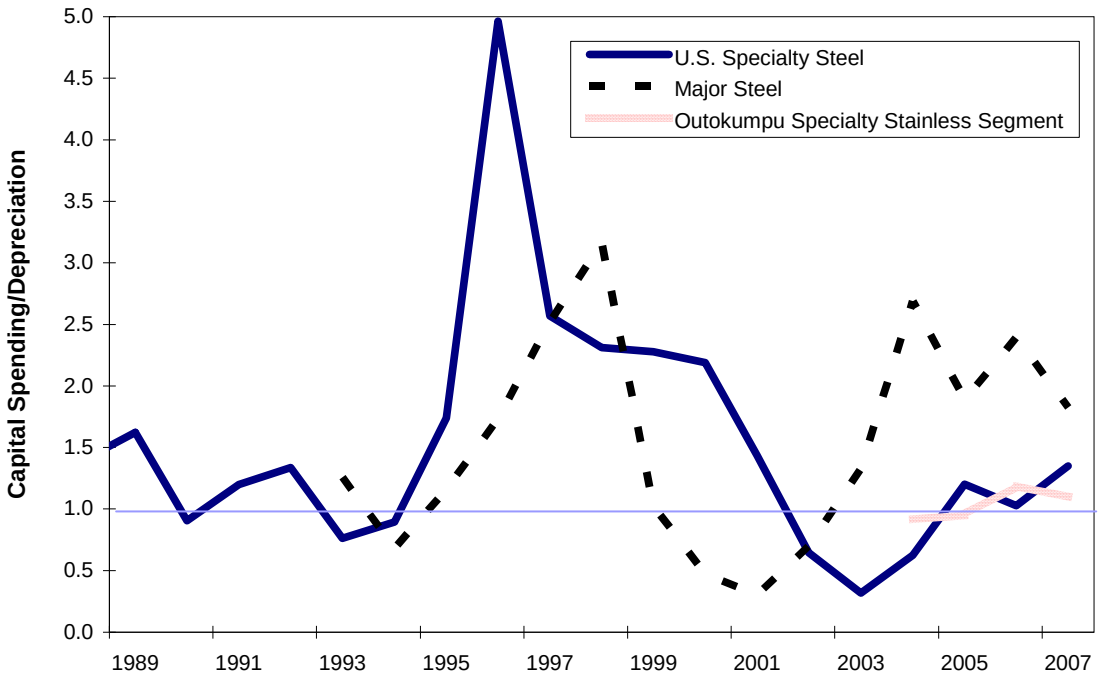
comparison to a special steel company that is mostly independent of the protections under Section 2533b. The CAPEX/D&A ratio for both sets of special metal companies, U.S. domestic and Outokumpu, overlap for the period 2004 to 2007.



Source: Computstat and Capital IQ.

Figure 2. Capital Expense/Depreciation Ratio for U.S. Titanium Producers and VSMPO

Table 2 (page 10) shows that R&D expense, both by itself and as a share of revenue, is lower for the protected firms than for firms in other capital intensive sectors such as aircraft (Boeing) and semiconductors (Intel). This is not surprising, given the different nature of these businesses. More importantly, R&D is also negligible in the reference metal suppliers whose products are not affected by Section 2533b. (Alcoa appears to be an outlier among the reference metal suppliers, in that it does relatively more R&D. This is probably because it is a much larger and more complicated business than even the largest specialty metals companies.) One explanation is that the industry and its technologies are fairly mature and may not require substantial R&D spending at a level worth noting in a financial report. The product life cycle of a metal is much longer than it is for industries like semiconductors. Therefore, we did not do further analysis on R&D spending.



Source: Computstat and Capital IQ.

Figure 3. Capital Expense/Depreciation Ratio for U.S. Specialty Steel Producers and Other Major Steel Producers

The data collection and the associated analysis were performed prior to the credit crisis that emerged in September 2008. This crisis raised the probability of a global recession, which could have an adverse effect on the investment plans of all metals companies. A global recession could cause the demand for commercial aircraft to decline causing a drop in demand for aerospace titanium and other special metals. For example, Alcoa, although not explicitly in our sample, has stated that they plan on halting all "unessential" capital projects.[2]

C. TYPES OF INVESTMENT PROJECTS

Public information, as supplemented by the survey responses, reflects recent or planned investment in new equipment or major upgrades across many companies and stages of production. Capital expenditures occurring or announced in 2006–2008 were examined for the studied specialty metals companies for which information was available.

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2 Robert Guy Matthews, "Alcoa Retrenches as Soft Demand Cuts Profits," *The Wall Street Journal*, p. B1, October 8, 2008.

Of four companies involved in titanium production, three were investing in sponge production,[3] three were investing in melting equipment, and two were investing in equipment for producing basic forms (bar, plate, etc.).

Of ten companies involved in specialty steel production, six were investing in melting equipment, and seven were investing in equipment for producing basic forms. Only one out of these ten companies had no major new investment. Six of the companies indicated plans for substantial future investments in 2008–2010.

The following is a list of recent, publicly disclosed descriptions of major expansions that are presently in progress or planned:

- Allegheny Technologies is investing $100 million to upgrade titanium sponge production at its Albany, Oregon, facility (to be completed in 2008) and $460 million to build a new sponge facility in Rowley, Utah (to be completed in 2009). It is also investing $1.16 billion by 2012 for a new specialty metal hot rolling and finishing facility and for consolidating melting operations.
- RTI is investing $300 million in a new titanium sponge facility in Hamilton, Mississippi, and $100 million for other new melting, forging, and rolling facilities, to begin initial production in 2010.
- Brush Wellman is investing $23.2 million in a $90.4 million public-private partnership with the Department of Defense to expand its beryllium processing plant, to be completed in 2010.
- ThyssenKrupp's Steel and Stainless units are jointly investing $3.7 billion in a new complex in Mount Vernon, Alabama, part of which will produce stainless steels. By quantity, the stainless production will be 1 million metric tons per year versus 4.1 million metric tons per year for carbon steel.
- Carpenter Technology is investing $115 million in specialty metals melt equipment, including several different furnaces, to be completed by 2009 at its Reading, Pennsylvania, facility.
- Valbruna is in the midst of a $19.25 million project to build a new remelt facility at its Fort Wayne, Indiana, plant. The company expects that the products will be used in components in jet engines and landing gear on airplanes. In addition, five other companies—Carpenter (see above), Universal, Latrobe, Electralloy, and Crucible—have added remelt capacity to serve strong aerospace demand within the past few years.[4]

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3 Titanium sponge is not protected by Section 2533b.

4 Maria Guzzo, "Valbruna Paves Way for Remelt Facility in Indiana," *American Metal Market*, September 19, 2007 (available from amm.com).

Table 3 shows the types of investment projects being performed by the special metals companies in titanium and in specialty steel. In titanium, industry is stepping up volume to meet demand, and much of the investment in specialty metals is also capacity-related. We do not see any large allocations of capital toward non-traditional uses.[5] The investments in titanium sponge represent capacity expansion outside the domain of Section 2533b, but the other projects are likely to be of benefit to the future supply of strategic materials or the efficiency of their production, thus benefiting the Department of Defense.

[5] As previously stated, traditional uses of titanium and special steels involve high temperatures, a corrosive environment, a need for saving weight and high fatigue strength.

Table 3. Types of Investment Projects

	Capital Expenditures for New Equipment or Major Upgrades					
	Titanium			Specialty Steel[a]		
Company	Sponge	Melt	Basic Forming[b]	Melt	Basic Forming	Other
Allegheny Technologies	X	X	X	—	X	X[c]
TIMET	X	X	—	—	—	—
RTI International Metals	X	X	X	—	—	—
Latrobe Specialty Steel	—	—	—	X	—	—
Brush Engineered Metals/Brush Wellman	—	—	—	—	—	X[d]
Carpenter Technology	—	—	—	X	X	—
Molycorp, Inc. (Chevron subsidiary)	—	—	—	—	—	—
Alcoa Howmet (includes Ti-Ingot and Dover Alloy units)	—	—	—	—	—	—
Electralloy	—	—	—	X	—	—
Outokumpu Stainless	—	—	—	—	—	—
ThyssenKrupp VDM/Stainless USA	—	—	—	X	X	—
Universal Stainless and Alloy Products	—	—	—	X	—	—
Valbruna Slater Stainless	—	—	—	X	—	—
Haynes International	—	—	—	X	X	—

Note: This table is based on non-proprietary information and thus may omit some private company investment projects.
[a] Some "Specialty Steel" equipment may also be used for producing other specialty metals (e.g., nickel alloys).
[b] "Basic Forming" refers to the processes for producing basic shapes (bar, plate, etc.).
[c] Zirconium sponge and melting; nickel alloy melting.
[d] Beryllium processing.

IV. SUMMARY

We found that the U.S. strategic metals industry is investing in new processing plants and equipment. The quantitative evidence is the high CAPEX/D&A ratio for most of the special metals companies in Table 2 and Figures 2 and 3. If this metric is greater than unity, the company is investing faster than it is writing off assets—suggesting growth. Furthermore, when benchmarked against other companies that are capital-intensive, the special metals companies are investing at a relatively faster rate. Investment includes melt capacity, mill and bar operations, and titanium sponge capacity.

Special metals investment is primarily driven by demand for commercial aircraft applications. Unlike the "advanced materials" industry of the 1980s that looked mainly to military applications, today's materials industry is dominated by global commercial applications, including aerospace, conventional and nuclear power generation, energy exploration, and chemical plants. In this context, while we have seen the industry increase its investment rate over the last few years, this investment trend could be delayed or reversed if the global economy declines in 2008 or 2009. It is likely that the Department of Defense benefits from the investments made by the industry since the assets appear to be capable of processing both military and commercial grades.

APPENDIX A:
SPECIALTY METALS COMPANY QUESTIONS

1. What is their annual revenue, operating profit, training expense, R&D expense, capital spending, assets, and depreciation and amortization:
    a. Broken out by product or business segment
    b. By plant or location
    c. By defense vs. non-defense
2. What products do you sell to defense market customers that are protected by the Berry Amendment, e.g.:
    a. Primary metals, i.e., ingot
    b. Formed products, i.e., rolled or extruded
    c. Engineered
3. Describe types of R&D and capital projects performed, e.g.:
    a. Process improvement
    b. New products, e.g., new alloys
    c. Capacity
    d. Innovative products to facilitate the expansion of market
    e. Describe new technologies being developed to increase supply and reduce cost of special metals.
    f. Environmental impact reduction
    g. New technologies to reduce carbon footprint
4. How do you determine what to invest in? e.g.:
    a. What existing customers are looking for, i.e., new product or more capacity
    b. Entering new markets with new product
    c. Entering new markets with existing product
    d. Establishing new disruptive technological advances that benefit the entire special metals market?
    e. Expansion of total market usage of special metals.
5. How do you determine how much to invest, e.g.:
    a. Benchmark against specialty metal peers
    b. Benchmark against other metals/materials companies
    c. Enough to achieve operational measures, e.g., capacity or efficiency level
    d. Mapping economic cycles for various special metals markets.
    e. Return on investment.
6. What keeps you from investing more than you do?
7. What drives training budgets?
8. How do you determine training budget?
9. What do you do to facilitate higher level education in U.S. universities?

    a. Do you sponsor graduate student research and development at any U.S. universities?
    b. Describe the program(s)
10. Training budget breakdown by labor category:
    a. Direct labor, engineering, support, etc.
    b. Defense vs. non-defense
11. Classification of annual capital spending projects:
    a. Breakdown of capital projects by type i.e. process improvement, new product, capacity, etc.
    b. Breakout project by defense, non-defense, or common
12. Classification of annual non-capitalized R&D projects:
    a. Breakdown of projects by type, i.e., process improvement, new product, capacity, etc.
    b. Breakout project by defense, non-defense, or common

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13. SUPPLEMENTARY NOTES

14. ABSTRACT
IDA assisted the Strategic Materials Protection Board in assessing the extent to which domestic producers of strategic materials are investing to ensure continued domestic production of these materials. IDA identified the domestic producers of strategic materials, developed a data request to the companies, and developed evaluation criteria. The paper presents analyses of company investment using public data and a non-proprietary summary of the survey results. We found that U.S. strategic materials producers are investing for continued domestic production. The titanium sector is investing aggressively in anticipation of a growing share of global commercial aerospace material markets, for dramatic expansion. The specialty steel sector is now starting to invest more capital to serve expanding markets worldwide, for more modest growth. Many companies are planning future investments, though it is expected that this will depend on economic conditions.

15. SUBJECT TERMS
Strategic Materials; Production; Investment

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